

## CLAIMS

### WHAT IS CLAIMED IS:

1. A method for producing an optical fiber having an optical grating, comprising the steps of:
  - providing an optical fiber having a glass core and a thermally stable exterior coating; exposing first and second portions of said optical fiber to a hydrogen-containing atmosphere under exposure conditions comprising (a) an exposure temperature of greater than 250°C, and (b) an exposure time of less than about 1 hour, thereby forming a treated optical fiber wherein the coating is thermally stable during and after the exposing step; and
  - writing an optical grating on the treated optical fiber without removing the coating such that said first portion of the optical fiber contains the grating and said second portion of the optical fiber is devoid of any grating,wherein the exposure time is within the range of about 1 minute to about 10 minutes.
2. The method of claim 1, wherein the exposure time is within the range of about 1 minute to about 5 minutes.
3. The method of claim 1, wherein the optical fiber is rapidly cooled after exposure to the hydrogen-containing atmosphere, wherein the cooling includes placing the fiber on a cold thermally conductive surface.
4. A method for improving the photosensitivity of an optical fiber, comprising the steps of:
  - providing an optical fiber comprising a glass core and an exterior coating; and
  - exposing the optical fiber to a hydrogen-containing atmosphere under exposure conditions comprising (a) a temperature of greater than 250°C, and (b) an exposure time of less than about 1 hour;wherein the coating is thermally stable under the exposure conditions.

8 wherein the exposure time is within the range of about 1 minute to about 10  
9 minutes.

1 5. The method of claim 4, wherein the exposure time is within the range of about 1  
2 minute to 5 minutes.

1 6. The method of claim 4, wherein the optical fiber is rapidly cooled after exposure  
2 to the hydrogen-containing atmosphere by placing the fiber on a cold thermally  
3 conductive surface.

1 7. A method for producing an optical fiber having increased photosensitivity,  
2 comprising the steps of:

3 providing an optical fiber comprising a glass core and a thermally stable exterior  
4 coating;

5 exposing the optical fiber to hydrogen gas heated to a temperature of  
6 greater than 250°C until the optical fiber is essentially saturated with hydrogen,  
7 thereby forming a treated optical fiber and wherein the coating is thermally stable  
8 under the conditions at which it is exposed to the hydrogen gas; and

9 rapidly cooling the treated optical fiber,

10 wherein the optical fiber is exposed to the hydrogen gas for an exposure time  
11 within the range of about 1 minute to about 10 minutes.

1 8. The method of claim 7, wherein the optical fiber is exposed to the hydrogen gas  
2 for an exposure time within the range of about 1 minutes to about 5 mines.

1 9. The method of claim 7, wherein the optical fiber is rapidly cooled after exposure  
2 to the hydrogen-containing atmosphere by placing the fiber on a cold thermally  
3 conductive surface.